television bulletin
ONTARIO DEPARTMENT OF EDUCATION
JUNIOR MATHEMATICS NO. 4

OHoC
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JUNIOR MATHEMATICS – 12 programs of 20 minutes each

BULLETIN NUMBER 4

The schedule below is applicable to programs 11 and 12 of this series.

PROGRAM NUMBER	CBC 10:00	CBOT 9:30	CKCO 9:30
11	April 1	April 18	April 1
12	Not shown	April 25	April 8

MEASUREMENT IN ACTION III – ANGLE

program eleven

AIM

The aim of the program is to examine the concept of angle, and its unit of measurement. The application of angle to latitude and longitude is considered in detail.

PROGRAM CONTENT

The program begins with a number of examples where angles can be seen in the environment. The host illustrates how semaphore is one application of angles and by using a flashlight, he examines the fundamental ideas of the angle. References are made to the ray and the vertex, and to the fact that the word 'angle' originates from the Latin word 'angulus', which means corner. A model is used to illustrate acute, right, obtuse, and straight angles. The program provides many examples of these in the environment and the students are given an opportunity to identify these angles in the visuals that are shown.

The question is raised as to what type of unit is used to measure angles. Reference is made to the Egyptian calendar, which had 360 days for a complete rotation around the sun. The degree is introduced as a unit to measure the angle. It is established that a right angle has 90 degrees and a straight angle 180 degrees. There is no attempt to teach the use of a

protractor (to measure angles) but, in addition to the protractor, reference is made to other methods of measuring angles at sea and in industry. By means of a model the concepts of latitude and longitude to indicate positions on the earth's surface are described in detail. The meaning of parallels of latitude and meridians of longitude is explained. For interest, reference is made to the Golden Plover, which crosses two thousand miles of open ocean from the Aleutian Islands and lands every time in Hawaii, and to the migrating Sea Turtles who swim from Brazil 1400 miles to nest in the Ascension Islands, apparently without means of navigation.

PRE-VIEWING ACTIVITIES

a. Examine different types of angles
b. Discuss the meaning of rotation
c. Examine globes and maps for latitude and longitude lines.

SUGGESTED POST-VIEWING ACTIVITIES

1. The following points could be discussed:
   a. the angles involved in making semaphore symbols
   b. the meaning of ray, vertex
   c. the meaning of the Roman word angulus
   d. the meaning of acute, obtuse
   e. the use of the protractor to measure angles
   f. the Egyptian calendar with 360 days
   g. the relationship of one degree to a complete rotation.

2. Examine the environment for examples of acute, right, obtuse, and straight angles, and how they are used.

3. Construct a semi-circular protractor from cardboard:
   a. with a clockwise scale
   b. with a counter-clockwise scale
   c. with both scales.

   Measure the values of acute, and obtuse angles obtained from such situations as angles made by clock hands, tree branches, furniture designs.

4. Discuss how latitude and longitude enabled man to establish a grid system on the earth's surface in order to locate positions. The following points could be discussed:
   a. the use of angles to denote the meridians of longitude and the parallels of latitude.
   b. the parallels of latitude are only marked up to 90 degrees but the meridians of longitude are marked up to 180 degrees.
   c. the equator is used as the starting position for parallels of latitude; the starting line for the meridians of longitude passes through Greenwich in England.
   d. locate positions in terms of latitude and longitude for cities on the different continents.
   e. find the position on the earth's surface indicated by such readings as:
      i. 10 degrees South – 17 degrees West
      ii. 45 degrees North – 48 degrees East.

MEASUREMENT IN ACTION IV – PRECISION

program twelve

AIM

The aim of the program is to show that wherever there is a need for great accuracy, exactness or precision in measurement, man invents or develops instruments to help him.

PROGRAM CONTENT

The program opens with a film of a jet airliner landing at an airport in conditions of heavy fog. The host explains that the pilot and ground control depend upon complex precision instruments in order to land the aircraft safely since there is no margin for human error. He explains that the need for precision instruments is greater today than ever before owing to the accelerated speed of progress, and the demand for increasing efficiency in measurement. Among the various precision instruments shown are:

- stopwatch – records within 100ths of a second
- fathometer – measures the depth of the ocean and charts the ocean floor
- radio telescope – records electrical signals from outer space
- hydrographs and thermographs – measure and record humidity
- chemical – balance scale – weighs handwriting on paper
- tipping bucket – measures rainfall
- weather vanes, barographs, sunshine recorders
- high fidelity and stereo components
- devices to control hydro-electric energy
- dynamometer – measures automobile efficiency by duplicating road conditions
- precision instruments in medicine and surgery
- the electron microscope.

The host notes that as new demands cause new developments, previous precision instruments come into general circulation, e.g. present day household appliances. The host speculates on precision tools of the future, such as laser beams, which measure in billionths of an inch, and concludes that limitations on measurement will be a significant factor in future development.

PRE-VIEWING ACTIVITIES

a. Discuss the word 'Precision'
b. Discuss developments that would make the invention of new measuring instruments necessary, (e.g. in science, medicine, space, biology).

SUGGESTED POST-VIEWING ACTIVITIES

1. Discuss the necessity for any or all the precision instruments shown on the program, and the value of these instruments to mankind.

2. Discuss which precision instruments of today may be in current household use in the future.

3. "Invent" a precision instrument of measurement and describe the need it was intended to serve.